

The prize this year was won by Dr. D. G. McKerracher, of Brockville, Ont., for his paper entitled, "The diagnosis and treatment of neurotic disorders", and which he was scheduled to deliver at the recent annual meeting of the Association. Owing to Dr. McKerracher's illness, however, which prevented him from being present, the paper was read by title. A.G.N.

Vitamin K

We would draw attention to the paper in this issue by Drs. Townsend and Mills, dealing with the use of vitamin K and bile salts in controlling the hæmorrhagic tendency associated with ob-

structive jaundice. The literature on this subject is growing very rapidly, but it is only recently that clinical application has been made of facts which were recognized in cattle some time ago. The problem of excessive bleeding in obstructive jaundice has always constituted a grave surgical difficulty, and its solution will be an advance of great value. This paper, whilst being in the nature of a preliminary report, encourages the hope that the problem is being mastered. It also emphasizes the essential association (if there be need to emphasize it) between laboratory medicine and everyday surgical practice. H.E.M.

Special Article

DIET AND NUTRITION

GOOD NUTRITION*

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XVIII.

What do we understand by the term "state of good nutrition", and how are we to attain to this desirable state? It is usually assumed that the state of good nutrition and of being or looking well fed are the same thing. This is far from being the case. There is more danger in the modern world, where food is plentiful, of being overfed than underfed. A common belief is that the usual cause of malnutrition is lack of adequate food, and although this may be one of the causes it is by no means the only one. A person may be in a state of malnutrition from overindulgence in food. Although a proper supply of food, adequate alike in quantity and quality, plays perhaps the most important rôle in the development of the state of good nutrition there are many other factors which influence, and even determine, this desirable state of well being. Thus in addition to food there must be adequate sleep, fresh air, exercise, contentment of mind, and so on. You all realize the ill effects of lack of sleep, the depression resulting from lack of fresh air, for some, at least, the loss of energy when exercise is curtailed, and the feeling of ease and lightheartedness associated with contentment of mind. The mind, the spirit, the psyche, call it what you will, plays an enormous rôle in the perfection of nutrition.

There is a very intimate relationship between the soundness of the mind and the soundness of the body. I have been trying to make clear to you that the state of good nutrition and fitness is a very complicated process about which we know little scientifically. But what we are clear about is that the end we desire to reach through attention to the various factors known to play parts is the building up of healthy human beings, well balanced physically, mentally and emotionally, who will be capable of all the necessary adjustments to their immediate environment, be it of work or play.

It is however perfectly true that a supply of proper food is one of the essentials. When food is taken it subserves two well defined functions in the body. One of these is to supply energy to make good that which is lost in the course of every day activity. The other is to supply material for the repair of tissue broken down in the course of day to day living, and, particularly in childhood, to supply material essential for growth. But few realize the miracle that takes place within the body after the food is eaten—the conversion of dead inert foodstuffs into living tissue. This is no haphazard rebuilding in which any kind of material is utilized. A very definite selection is made of the required building stones, especially those which are derived from the very complex and varied nitrogen-containing materials called, scientifically, proteins. So far as the first function is concerned it may be stated that the great bulk of the food eaten is used for energy production. Food, as we commonly call it, is a mixture of many materials. But whether it be the humble sausage and mashed potatoes or the most expensive items on the menu all foodstuffs can be reduced or analyzed into six components or classes of substance — proteins, fats, carbohydrates, mineral salts, vitamins and water. Of these six groups two (fats and carbohydrates) are perhaps in the main, but not exclusively,

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concerned with the supply of energy to the body, whereas the others are more intimately related to the repair and building up of the activities of the body. Most of our foodstuffs are mixtures of these various components. Thus meat consists of protein, fat and water, with small amounts of the other substances; oatmeal has protein and carbohydrate, again with small amounts of the remaining substances; egg has protein, fat and water, with traces of the other materials, and milk is an excellent mixture of protein, fat, carbohydrate, vitamins and mineral salts in solution. Each of these basic components plays an important rôle. Proteins, like lean meat, white of egg, cheese, are absolutely essential in the diet, as they are the only available sources of the nitrogen required for the building of all living tissue. But all proteins are not of equal value. The proteins which most closely resemble in chemical structure those of the tissues are the best. They are often called first class proteins; proteins present in milk, for instance, belong to this class. One of the reasons why people are recommended to eat a good mixed diet is that when first class proteins are eaten with proteins of lesser value, such as those found in cereals, they bring about an enhancement of the nutritive value of the latter; the proteins are said to be supplementary. This supplementary action is one of the justifications for eating vegetables with meat and porridge with milk.

Although fats and carbohydrates, like starches and sugar, are in the main concerned with the supply of energy to the body, that is, they are utilized mainly as fuel, they also play an important part in other tissue activities. But fat cannot wholly replace carbohydrate in the diet, and it cannot be properly utilized by the body in the absence of carbohydrate. Carbohydrates, as a general rule, form the bulk of the diet. They are a kind of elastic reserve by means of which we equalize the varying day to day demand for food to meet energy needs.

When it is realized that over 60 per cent of the body weight is made up of water it is obvious that a plentiful supply of water is necessary to make good the daily losses. A man may live for several weeks without food, but only for a few days without water. Further, all the tissue reactions take place in a fluid medium and are associated, for the most part, with the passage of water, either into or out of the various chemical molecules.

Some five or six vitamins have been definitely identified. These vitamins play important but as yet not definitely determined rôles in normal bodily activities. Although our present knowledge enables us to cure or alleviate certain diseases which are now recognized as being due principally to vitamin deficiency, for example, scurvy from lack of vitamin C and beri-beri from lack of vitamin B₁, we are still very much in the dark about the amounts of the various vitamins which are required for the maintenance

of health. It is more or less agreed that it is best to take the necessary vitamins in the form in which they are provided by nature.

The mineral salts, of which a very large variety are found in the different body tissues, are also essentials of the diet. These salts participate in almost all of the tissue activities. Excessive loss of a simple salt like sodium chloride, or common salt, during sweating is now known to account for the distressing symptoms of fireman's or miner's cramp. An ample supply of calcium or lime and of phosphorus is essential for the proper formation of bone; a supply of iron and, possibly, a trace of copper for the formation of the red colouring matter of blood, and so on. Salts are also vital for the maintenance of the proper reaction of the tissue fluids.

All this may appear to be a most complicated account of what is necessary in food, but if a good mixed diet which is ample enough in amount to meet the energy needs of the body is taken there is little risk under normal conditions of the diet proving inadequate, except perhaps as regards minerals. The diet eaten need not be elaborate. So far as our knowledge at present goes a diet of brown bread, butter, milk, cheese, vegetables, and fruit would suffice to yield all the essentials. Of these various foodstuffs milk stands in a unique position. Why is milk so praised as an article of diet? Why has it been said that "milk is the most satisfactory individual food material elaborated by nature"? Why has it been stated that "milk should form a conspicuous element of the diet of all ages", and that "almost any diet can be considerably improved by the liberal addition of milk"? Because milk contains a supply of first class protein, of fat, of carbohydrate, is one of the best and most readily available sources of calcium and other valuable mineral salts, as well as of a fair selection of vitamins. Milk in all its forms, liquid, evaporated, dried, or in the form of cheese, provided always it be clean and free from disease germs, is a most excellent physiological combination of the food materials requisite for the upbuilding and repair of body tissues.

I stated at the start of this talk that although food played a most important part in the development of good nutrition or fitness there were other factors of importance. The achievement of fitness, of good health, means more than the consumption of so much food, of getting so much fresh air, exercise, sleep, and so on. There is the non-physical side to be remembered. Malnutrition of the spirit is quite as common if, indeed, not more common than malnutrition of the body. The one reacts upon the other. So many people are vociferously demanding what they call their rights that they forget they have duties, to themselves and the community. It must not be forgotten that the attainment of fitness demands discipline. Discipline is essential for right living. Right living means health.